Claims:

1. An apparatus for conducting electrophysiological measurements on cells (16) comprising a measuring head (20), the measuring head being provided with at least one electrode (30-36) for impaling the cells (16), characterized in that the electrodes (30-36) are integrated into a common support (22).

2. The apparatus of claim 1, characterized in that the electrodes (30-36) are inserted into recesses within the support.

3. The apparatus of claim 1, characterized in that the electrodes (30-36) are molded into the support.

4. The apparatus of one or more claims 1 through 3, characterized in that the electrodes (30, 34) consist of pulled glass tubes.

5. The apparatus of one or more of claims 1 through 4, characterized in that the electrodes (30, 34) have an electrical resistance of between 5 MΩ and 100 MΩ.

6. The apparatus of one or more of claims 1 through 4, characterized in that the electrodes (30, 34) have an electrical resistance of between 500 kΩ and 5 MΩ.

7. The apparatus of one or more of claims 1 through 3, characterized in that the electrodes (30-36) are configured as wire electrodes.

8. The apparatus of claim 7, characterized in that the electrodes (30-36) are configured as silver wire electrodes.

9. The apparatus of claim 8, characterized in that the electrodes (30-36) are configured as silver wire electrodes provided with a chloride coating.

10. The apparatus of one or more of claims 1 through 9, characterized in that at least one electrode (30-36) has a straight section (42, 46).

11. The apparatus of one or more of claims 1 through 9, characterized in that at least one electrode (30-36) is provided with a tip (44, 48) at its front terminal end.

12. The apparatus of one or more of claims 1 through 11, characterized in that two electrodes (30-36) are arranged essentially symmetrical relative to a longitudinal axis (24) of the carrier (22).

13. The apparatus of claim 12, characterized in that the electrodes (30-34) have a distance d at their free terminal end being between 50 μm and 800 μm, preferably between 200 μm and 500 μm.

14. The apparatus of claim 12 or 13, characterized in that at least one electrode (30-36) has a straight section (42,

46), the straight section (42, 46) enclosing an acute angle α with a longitudinal axis (24) of the support (22).

15. The apparatus of claim 14, characterized in that the acute angle α is between 3° and 10°, preferably 5°.

16. The apparatus of one or more of claims 1 through 15, characterized in that the at least one electrode (30-36) is configured as a measuring electrode (30, 34).

17. The apparatus of claim 16, characterized in that the at least one measuring electrode (34) is coupled to a measuring amplifier (56).

18. The apparatus of claim 17, characterized in that the measuring amplifier (56) is adapted to be adjusted (58).

19. The apparatus of one or more of claims 16 through 18, characterized in that the at least one measuring electrode (30) is connected to a current source (50).

20. The apparatus of claim 19, characterized in that the current source (50) is adapted to be adjusted (52).

21. The apparatus of one or more of claims 1 through 20, characterized in that the at least one electrode (30-36) is configured as a reference electrode (32, 36).

22. The apparatus of claim 21, characterized in that the reference electrode (32) is connected to ground (54).

23. The apparatus of claim 21 or 22, characterized in that two measuring electrodes (30, 34) and two reference electrodes (32, 36) are provided.

24. The apparatus of one or more of claims 16 through 23, characterized in that the at least two measuring electrodes (30, 34) are arranged in a first common plane (35).

25. The apparatus of one or more of claims 21 through 24, characterized in that at least two reference electrodes (32, 36) are arranged in a second common plane (37).

26. The apparatus of claim 24 and 25, characterized in that the first and the second plane (35, 37) extend parallel to each other.

27. The apparatus of one or more of claims 1 through 26, characterized in that at least one perfusion conduit is arranged on carrier (22).

28. The apparatus of claim 27, characterized in that at least one perfusion conduit is a perfusion outlet (38).

29. The apparatus of one or more of claims 16 through 28, characterized in that the perfusion inlet (38) as a first end opening (39), the perfusion inlet (38) being arranged essentially parallel with the at least one measuring electrode (30, 34), and that the first end opening (39) is located above a lower end of the at least one measuring electrode (30, 34).

30. The apparatus of claim 14 and 29, characterized in that the perfusion inlet (38) is arranged essentially on the symmetry between measuring electrodes (30, 34).

31. The apparatus of one or more of claims 27 through 30, characterized in that the perfusion inlet (38) is connected to a conveyor pump (70).

32. The apparatus of claim 31, characterized in that the pump (70) is adapted to be adjusted (72).

33. The apparatus of one or more of claims 27 through 32, characterized in that the perfusion inlet (38) is adapted to be connected to a plurality of storage containers via a controllable valve system.

34. The apparatus of claim 33, characterized in that the storage containers are arranged above the perfusion inlet (38).

35. The apparatus of claim 33 or 34, characterized in that the at least one storage container contains a test liquid.

36. The apparatus of claim 33 or 34, characterized in that the at least one storage container contains a rinsing liquid.

37. The apparatus of one or more of claims 27 through 36, characterized in that the perfusion conduit is a perfusion outlet (40).

38. The apparatus of claim 29 and 37, characterized in that the perfusion outlet (40) has a second end opening (41), the second end opening (41) being located above the first end opening (39).

39. The apparatus of claim 38, characterized in that the end openings (39, 41) are oriented along opposite directions.

40. The apparatus of one or more of claims 37 through 39, characterized in that the perfusion outlet (40) is connected to a suction pump (74).

41. The apparatus of claim 40, characterized in that the suction pump (74) is adapted to be adjusted (76).

42. The apparatus of claims 26, 28 and 37, characterized in that as viewed on first plane (35) the perfusion inlet (38) is located in front of the first plane (35) and the perfusion outlet (40) is located behind the second plane (37).

43. The apparatus of one or more of claims 1 through 42, characterized in that at least one measuring head (20) is arranged on an actuator (18), the actuator (18) being adapted to be displaced along a coordinate system (14) above a receptacle for the cells (16).

44. The apparatus of claim 43, characterized in that the actuator (18) carries a plurality of measuring heads (20, 20a, 20b).

45. The apparatus of claim 44, characterized in that the measuring heads (20) are adapted to be displaced individually relative to the actuator (18) along the axis z directed towards the cell (16).

46. The apparatus of one or more of claims 43 through 45, characterized in that the measuring head (20) is affixed to the actuator (18) by plugging or screwing.

47. The apparatus of one or more of claims 1 through 46, characterized in that means are provided for injecting cDNA and/or mRNA into cell (16).

48. The apparatus of claim 47, characterized in that the means are located on the actuator (18).

49. The apparatus of one or more of claims 43 through 48, characterized in that the receptacle for the cell (16) is configured as a standardized multi-well-plate (10).

50. The apparatus of claim 49, characterized in that the individual receptacles (12) within plate (10) are provided with a readable code (13), the actuator (18) comprising means for reading the code.

51. The apparatus of claim 50, characterized in that the code is a bar code and that the means are a bar code reading head (19).